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Director, Office of Research Informatics
Professor of Biomedical Informatics, Biostatistics, and
Biomedical Engineering
Vanderbilt University Medical Center

Innovative Use Cases for the new REDCap EHR Integration Module

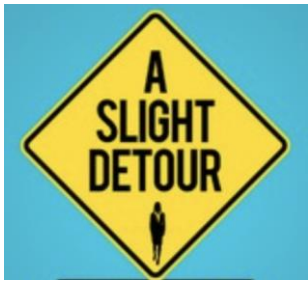


NIH Collaboratory

Rethinking Clinical Trials®

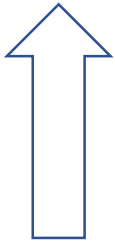
Agenda

- Introducing: REDCap & REDCap Consortium
- Inventing: EHR + EDC Interoperability
- Innovating: Applied Model for Clinical Trials

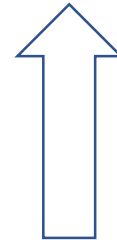


Invention and Innovation

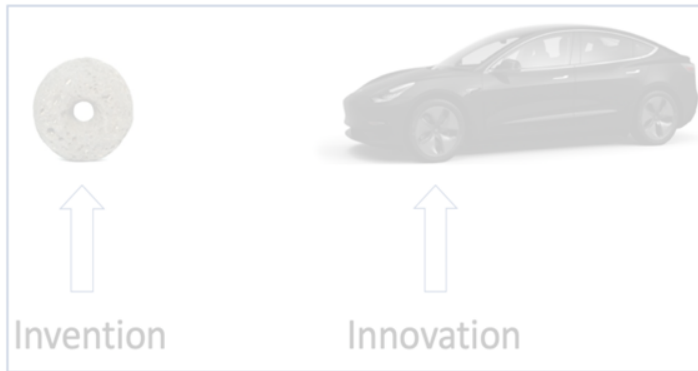
- **Invention** means having a totally original idea and showing how it can work in theory
- **Innovation** means putting a new idea into practice. This could be either bringing a new product to the market or by getting an organisation to try a new way of working



Invention



Innovation



Invention and Innovation

- **Invention** means having a totally original idea and showing how it can work in theory
- **Innovation** means putting a new idea into practice. This could be either bringing a new product to the market or by getting an organisation to try a new way of working

Too Few Words

Too Many Words

in·no·va·tion

The process of translating an idea or invention into a good or service that creates value ~~or for which customers will pay~~ at Vanderbilt and across the REDCap Consortium.

Agenda



- Introducing REDCap & REDCap Consortium
- Inventing: EHR + EDC Interoperability
- Innovating: Applied Model for Clinical Trials



redcap key features



All



Images



News



Videos



Shopping



More

Settings

Tools

About 322,000 results (0.69 seconds)

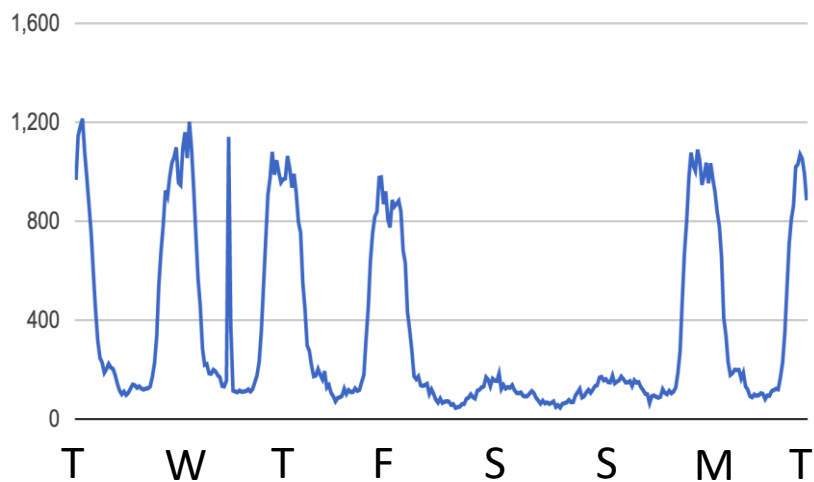
Features of REDCap

- Fast and flexible. ...
- Build online surveys and databases quickly and securely. ...
- Export data to common data analysis packages. ...
- Easily manage a contact list of survey respondents or create a simple survey link. ...
- Scheduling. ...
- Save your data collection instruments as a PDF to print. ...
- Ad hoc reporting. ...
- Advanced **Features**.

Map of VUMC Users (Last Week)



Concurrent VUMC Users (Last Week)



System Statistics

Total projects (excludes 'practice' projects)	68,672
• Project status	
- Production view types	25,145
- Development view types	29,768
- Inactive view types	3,028
- Archived view types	10,731
• Project types	
- Projects not containing surveys	16,422
- Projects containing surveys	52,250
• Project purpose	
- Research view subcategories	17,777
- Basic or bench research	2635
- Clinical research study or trial	6742
- Translational research 1 (applying discoveries to the development	865
- Translational research 2 (enhancing adoption of research findings	758
- Behavioral or psychosocial research study	4499
- Epidemiology	1168
- Repository (developing a data or specimen repository for future u	810
- Other	1674
- [Subcategory not selected]	930
- Operational Support	21,204
- Quality Improvement	21,141
- Other	7,883

User Statistics

• Users currently logged in	972
- Project users	481
- Survey participants	491

Available at no cost to Academic, Nonprofit, Government Organizations



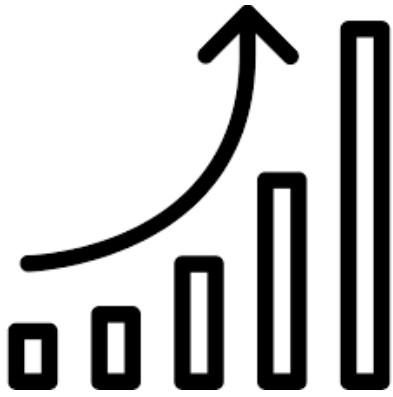
Institutions	Countries	Projects
3741	131	783k

over 1,060,000 users.

Map of REDCap Consortium Partners

[View fullscreen map](#)





Active Growth

October Partner Licensing ...

55 Consortium Partners added on 2019-10-01 through 2019-10-18 Update	
Country	Institution Name
Argentina	Corte Suprema de Justicia de la Nacion
Argentina	Fundación Natali Dafne Flexer
Argentina	Fundacion Helios Salud
Argentina	Sociedad Argentina de Cardiología
Australia	Biologic Data Science Institute The Australian National University
Bolivia	Universidad Mayor de San Simon
Brazil	Centro Universitário São Camilo
Brazil	Instituto de Doenças do Tórax da Universidade Federal do Rio de Janeiro
Canada	MICYRN
Canada	MICYRN
Canada	Montreal Heart Institute Research Center
Canada	Vancouver Infectious Diseases Centre
Switzerland	Jacobs Center for Productive Youth Development - University of Zurich
Cote d'Ivoire	Programme PAC-CI
China	Chinese holistic integrative med-ir
China	Dept. Neurosurgery, West China Hc
China	Sun Yat-sen Global Health Institute
Germany	Klinikum Dortmund gGmbH
Germany	UNIVERSITÄT LEIPZIG Medizinische
Germany	University Hospital Schleswig-Holst
Spain	ASOCIACIÓN INSTITUTO DE INVEST
Spain	Institut Guttmann
United Kingdom	Imperial College London, Departm
United Kingdom	Institute of Cancer Research
United Kingdom	KALMOD Behaviours for Health Co
Ireland	Graduate Entry Medical School, Uni
Israel	Wolfson Medical Center
India	ALL INDIA INSTITUTE OF MEDICAL S
Kenya	Coast General Teaching And Referr
South Korea	Chonbuk National University Hospi
South Korea	International Vaccine Institute
Mali	International Center of Excellence in Research - Mali
Nigeria	Public Health Research Group, Department of Epidemiology and community Health Community Health
Netherlands	KNCV Tuberculosis Foundation
Senegal	UNIVERSITE DE THIES
United States	Baltimore City Health Department
United States	Bellin College
United States	CAMC Health Education and Research Institute
United States	Center for Health Information and Analysis
United States	Cobb County Government
United States	Community Building Institute Middletown, Inc.
United States	Institute for Neurodegenerative Disorders, Inc.
United States	Jackson State University - RTRN/Data Coordination Center (DCC)
United States	Jackson-Hinds Comprehensive Health Center
United States	Merced County
United States	Midway Specialty Care Center Inc
United States	Norton Healthcare
United States	Oregon Social Learning Center
United States	Park Nicollet/ HealthPartners
United States	Somerset County and Plainfield YMCA
United States	State of Oregon / Office of Information Services
United States	Wilkes University
Vietnam	School of Preventive Medicine and Public Health
Zambia	Ministry of Health Zambia
Zimbabwe	Africa University





> 8,300 articles in diverse biomedical research domains have cited use of the platform





**This is great,
but will it do ...**



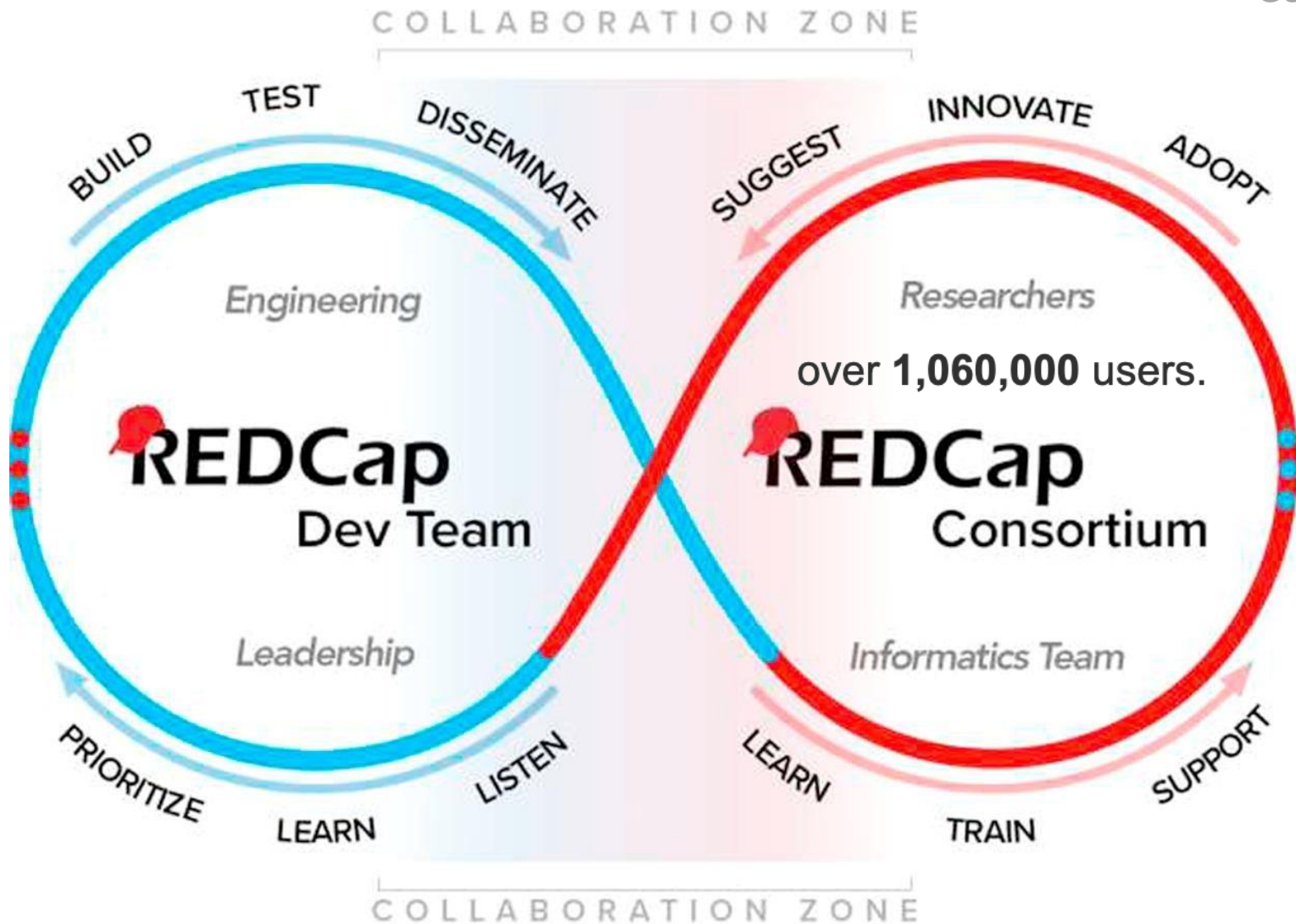
Used Systems
Get Better



It's the *Bi-Directional Empowerment ...*



Used Systems
Get Better



Agenda

- Introducing REDCap & REDCap Consortium
- **Inventing: EHR + EDC Interoperability**
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**Any chance
you could
integrate in
some way
with our EHR?**

That's pretty hard to do EHR vendors are different and

tend to hang onto their data,
lack of standards, mapping
is complex, permissions,
regulatory requirements,
privacy requirements, 'easy'
at project level – but hard
to scale, even harder across
institutions, blah, blah, blah



Any chance
you could
integrate in
some way
with our EHR?

*e.g. so we don't
have to
copy/paste?*



VUMC Reporter

Vendor for VUMC clinical systems upgrade
named

Dec. 18, 2015, 1:04 PM

Vanderbilt University Medical Center (VUMC) has announced an agreement with Epic Systems Corp., a privately owned health care software company based in Verona, Wisconsin, to provide key clinical, administrative and billing software to the Medical Center.

In November 2017, staff and faculty will switch to Epic software for medical record-keeping and clinic workflow, ordering of tests and treatments in hospitals and clinics, hospital scheduling and admissions, nursing documentation, medical management of surgical patients, outpatient prescribing, medication administration, (non-retail) pharmacy management and hospital billing.

Patients also will begin a transition to Epic software in order to continue engaging with their health care team and clinical information via the My Health at Vanderbilt patient Web portal.

Other applications to be covered by the agreement are yet to be determined pending a more detailed review of information technology needs across VUMC.

Vanderbilt sought new software because in March 2018 McKesson Corp. will stop supporting applications VUMC currently uses for hospital clinician order entry, nurse documentation, medication administration and pharmacy management.

Leaders say the agreement with Epic signifies a momentous transition at VUMC, which will result in a more integrated, efficient and mature information systems environment.

Most of the major clinical systems in use today at VUMC were developed here. Vanderbilt is among a handful of institutions that have pioneered biomedical informatics and health information technology over the past 25 years.

VUMC Reporter

EpicLeap launch signals start of bold new era

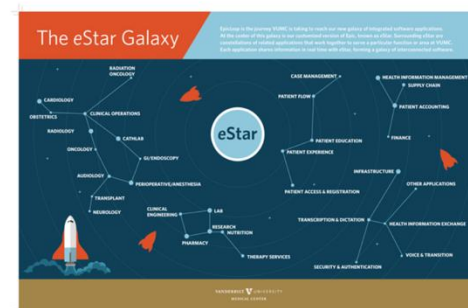
Oct. 26, 2017, 9:16 AM

On Nov. 2, Vanderbilt University Medical Center (VUMC) will switch to a new computer system, called eStar, which will support the health system's electronic health records, workflows for inpatient and outpatient care delivery, test ordering, billing and other hospital and clinic operations.

EpicLeap, the name given to the two-year project to switch to the new system, affects some 18,000 Medical Center employees who work in the health system, as well as VUMC's patients who use the My Health at Vanderbilt web portal to communicate with clinicians regarding their care.

Benefits of eStar include:

- Compared to the group of applications being replaced, eStar is light years ahead from a systems integration standpoint. Leaders say greater systems integration and ease of use promises better coordination of care across different care settings, and greater efficiency for clinical teams.
- Fees for hospital and professional services will be consolidated as one bill instead of two.



At the center of the EpicLeap galaxy is a system known as eStar, which comprises 25 different modules of Epic software. These modules underwent extensive customization to ensure they are fit for VUMC's specific needs.



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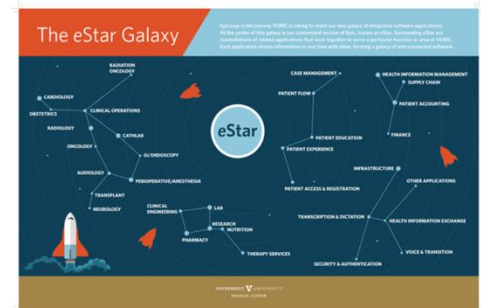
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- Fees for hospital and professional services will be consolidated as one bill instead of two, simplifying payments for patients.



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December 2015 → → → → → → → → → → → → → → → → November 02, 2017

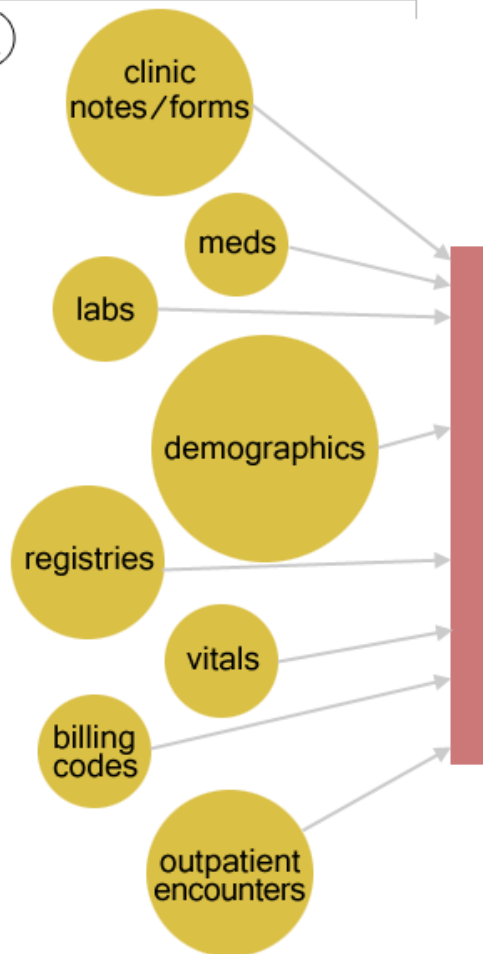


INVENT NEW METHODS

INITIAL WORK

CLINICAL ENTERPRISE

(A)

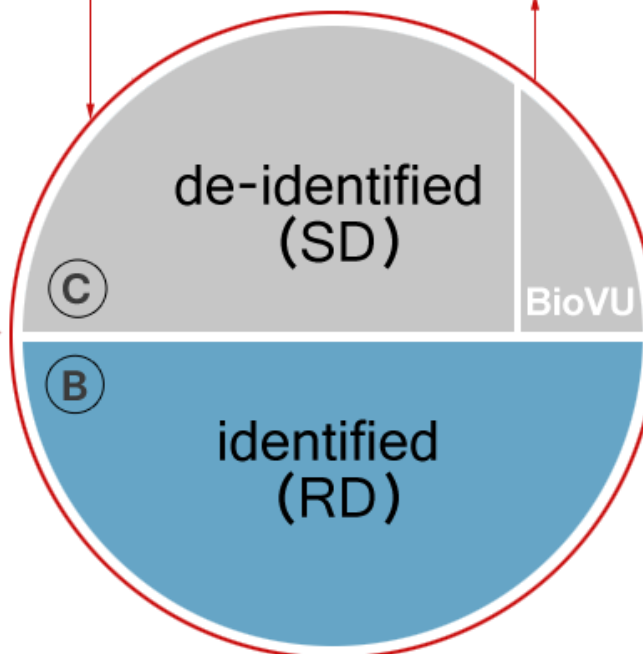


(E)

INFORMATICS METHODS DEVELOPMENT

(D)

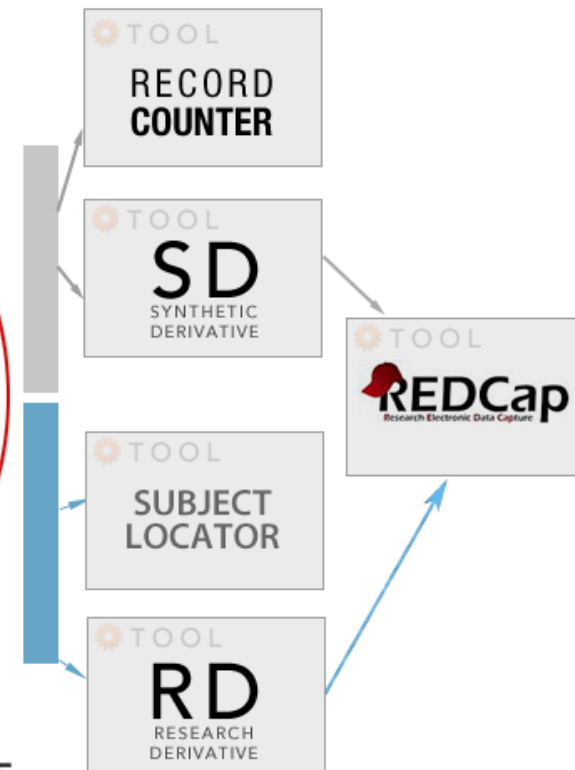
Examples: Natural Language Processing
Pattern Recognition
Automated Phenotyping
Automated Study Recruitment Eligibility
End User Research Integration Methods
Anonymization and Reidentifiability



RESEARCH DATA WAREHOUSE

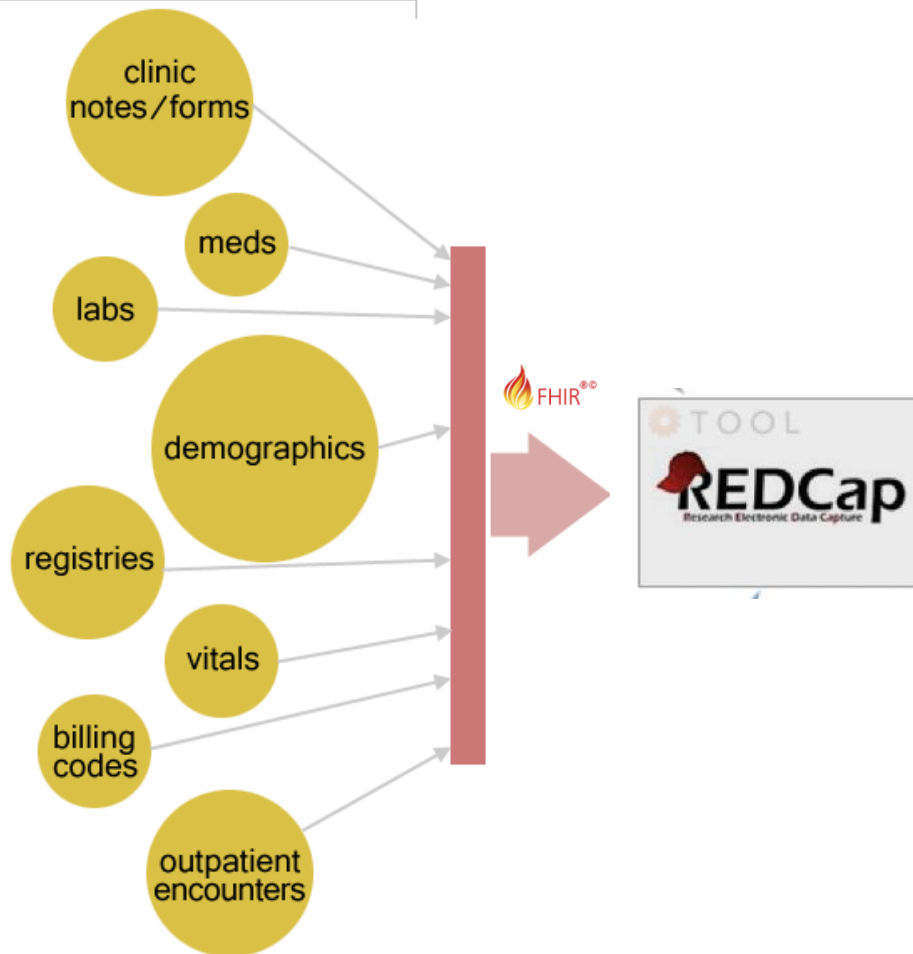
RESEARCH ENTERPRISE

(F)



INITIAL WORK

CLINICAL ENTERPRISE



Value Proposition

- *Instant Data Flow*
- *No Research Data Warehouse Dependency*

59-1 Heusinger, Leighton (Leight)

Attachments Notes Orders Patients Messaging EHR Managers Inventory References Reports

Leight... 25 year old...

None

CLINICAL SUMMARY

Clinical Summary

INCIDENTS

New Incident

New Incident

2015 Procedures

Third Visit

Encounter

New Patient Visit

Add New Incident...

PATIENT PORTAL

Registration Forms

NOTES

Note Templates

TEMPLATE LIBRARY

Shared Templates

TEMPLATE EDITOR

Templates

Sections

Filter All History Start Date End Date

Record ID 36

Patient Identifiers

Bypass start date and time Now Y-M-D H:M

Vanderbilt MRN

eCOS ID

STS ID

Pre-Operative Lab Values

Last Pre-op Creatinine (last serum creatinine level obtained prior to surgery)

Post-Operative Lab Values

HIGHEST Lab Values

Highest Post-op Glucose (Highest value within 72 hrs after surgery)

Highest Post-op Creatinine (highest value within 72 hours after surgery)

Highest Post-op AST (highest value within 72 hours after surgery)

Highest Post-op ALT (highest value within 72 hours after surgery)

Highest Post-op Lactate

In Break Out 0:00/72:18

Welcome, Leighton H

Value Proposition

- Research-Centric Workflow



Real Estate

+

Data Flow



Value Proposition

- *Research-Centric Workflow*

Value Proposition

- *Instant Data Flow*
- *No Research Data Warehouse Dependency*

If you can **think it**,
you can **do it**

Real Estate

+

Data Flow

Value Proposition

- *Research-Centric Workflow*

Value Proposition

- *Instant Data Flow*
- *No Research Data Warehouse Dependency*

If you can **think it**,
you can **do it**





Creating REDCap Project-Level Mapping for EHR→REDCap Data Exchange

Not as easy as it looks ...



Number of fields selected: 31 [Map the fields selected below](#) [Cancel](#)

Source Fields List Filter:

- ☒ **id (Medical record number)** ?
- ☒ **Demographics** [select all](#) [deselect all](#)
 - ☒ birthDate (Date of birth) ?
 - ☒ gender (Sex) ?
 - ☒ name-family (Last name) ?
 - ☒ name-given (First name) ?
 - ☒ address-line (Address (street)) ?
 - ☒ address-city (Address (city)) ?
 - ☒ address-state (Address (state)) ?
 - ☒ address-postalCode (Address (postal code)) ?
 - ☒ address-country (Address (country)) ?
 - ☒ phone-home (Phone number (home)) ?
 - ☒ phone-mobile (Phone number (mobile)) ?
 - ☒ email (Email address) ?
- ☒ **Condition** [select all](#) [deselect all](#)
 - ☒ problem-list (Problem List and health concerns) ?
- ☒ **Medications** [select all](#) [deselect all](#)
 - ☒ active-medications-list (Active medications list) ?
- ☒ **Vital Signs** [select all](#) [deselect all](#)
 - ☒ 8480-6 (Systolic blood pressure) ?
 - ☒ 8462-4 (Diastolic blood pressure) ?
 - ☒ 8310-5 (Body temperature) ?
 - ☒ 8867-4 (Heart rate) ?
 - ☒ 9279-1 (Respiratory rate) ?
 - ☒ 8302-2 (Body height) ?
 - ☒ 3141-9 (Body weight) ?
- ☒ **Labs**

MAP SOURCE FIELDS TO REDCAP FIELDS			
External Source Field (StarPanel)	Map to REDCap Field	Map to REDCap date/time field (Date/time value is used with day offset to construct window of time when searching for source data)	Remove mapping?
mrn "Medical Record Number" ★ Source Identifier Field	mrn "Medical record number"		
Demographics			
dob "Date of Birth"	dob "Date of birth"		✗
ethnicity "Ethnicity"	ethnicity "Ethnicity"		✗
firstName "First Name"	first_name "First Name"		✗
gender "Gender"	sex "Gender"		✗
lastName "Last Name"	last_name "Last Name"		✗
race "Race"	race "Race"		✗
Labs			
AN-GAP "ANION GAP" ✚ Use same mapping for other source field	angap "Anion gap (AN-GAP)" ✚ Map other REDCap field	Date/time field: visit_date "Visit date" Preselect a value (optional): -- none --	✗
BUN "UREA NITROGEN BLOOD" ✚ Use same mapping for other source field	bun "Urea nitrogen blood (BUN)" ✚ Map other REDCap field	Date/time field: visit_date "Visit date" Preselect a value (optional): -- none --	✗
CO2 "CARBON DIOXIDE BLOOD" ✚ Use same mapping for other source field	co2 "Carbon dioxide blood (CO2)" ✚ Map other REDCap field	Date/time field: visit_date "Visit date" Preselect a value (optional): -- none --	✗
Ca "CALCIUM BLOOD"	ca "Calcium blood (Ca)"	Date/time field: visit_date "Visit date"	✗



Enabling Workflow (REDCap in EHR)

Hyperspace - VUMC CLINICAL RESEARCH VIR - eStar Production

0

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□

×

Zzztest, Tdrthirtythree

PAUL H.

Redcap

?

×

REDCap[®] MRN 997000033 – Zzztest, Tdrthirtythree (DOB 1990-07-05)

Logged in as 8384 / harrispa

REDCap Clinical Data Pull

-- select one of your existing REDCap projects to add below --

+ Add patient to project

DDP_On_FHIR_Example

Remove

+ Add patient to project

STRESS DDP-ON-FHIR Test Project - HARRISCOPY

Remove

Learn more about this module: [What is 'Clinical Data Pull' \(CDP\)?](#)

View EHR patient identifier keys

REDCap 9.3.6 - © 2019 Vanderbilt University

Redcap



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REDCap 9.3.6 - © 2019 Vanderbilt University

Redcap



Enabling Workflow (REDCap in EHR) - continued

Hyperspace - VUMC CLINICAL RESEARCH VIR - eStar Production

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View EHR patient identifier keys

Confirm: Add patient to project?

×

You may add this patient to this REDCap project by clicking the 'Create record' button below, which will create a new record in the project and will add the patient's ID number (i.e., medical record number) to that record.

Project: DDP_On_FHIR_Example

Create record

Cancel

Redcap



Enabling Workflow (REDCap in EHR) - continued

Hyperspace - VUMC CLINICAL RESEARCH VIR - eStar Production

0

—

□

×

Zzztest, Tdrthirtythree

PAUL H.

Redcap

?

×

REDCap
[My Projects](#)

MRN 997000033 - Zzztest, Tdrthirtythree (DOB 1990-07-05)
Project: **DDP_On_FHIR_Example**

Logged in as 8384 / harrispa

Record

Adjudicate data from eStar

The grid below
entered for th
the colored st

[View DDP adjudication instructions](#)

Choose a

Stu

Data Coll

Demographic

Visit 1

Fetching data for Study ID "2"

Refresh data from eStar

New items: **13**

Time of last data fetch: less than a minute ago

MRN: 997000033

REDCap Field	REDCap Date/Time	eStar Source Date/Time	REDCap Current Value	eStar Source Value	Import? ↓
Demographics					
first_name "First Name"	-	-		Tdrthirtythree	<input checked="" type="radio"/> reset
last_name "Last Name"	-	-		Zzztest	<input checked="" type="radio"/> reset
street_address "Residence - Street Address"	-	-		MADISON	<input checked="" type="radio"/> reset
city "Residence - City"	-	-		WI	<input checked="" type="radio"/> reset
zip_code "Residence - Zip Code"	-	-		53703	<input checked="" type="radio"/> reset
telephone_1 "Phone number"	-	-		999-999-9999	<input checked="" type="radio"/> reset
ethnicity "Ethnicity"	-	-		Not Hispanic or Latino (1106 5)	<input checked="" type="radio"/> reset

Save

Cancel



Enabling Workflow (REDCap in EHR) - continued

Hyperspace - VUMC CLINICAL RESEARCH VIR - eStar Production

0

—

□

×

Zzztest, Tdrthirtythree

PAUL H.

Redcap

?

×

REDCap®

MRN 997000033 - Zzztest, Tdrthirtythree (DOB 1990-07-05)

Logged in as 8384 / harrispa

[My Projects](#)

Project: **DDP_On_FHIR_Example**

Race



White



Gender



- ☒ Female
☐ Male
☐ Unknown



reset

Date of birth



1990-07-05

31

Today

Y-M-D



Consent Form

Attachment: [DDP_On_FHIR_Example | REDCap.pdf](#) (0.2 MB)

Baseline Information From EHR

Baseline Medication List



multivitamin (THERAGRAN) tablet tablet, 1000, Take 1 tablet by mouth daily. - 2017-11-06

Expand

Baseline Problem List



Generalized anxiety disorder (300.02),
Generalized anxiety disorder (F41.1),
Generalized anxiety disorder (disorder)
(21897009) - active - 2017-12-08

Right tubal pregnancy without intrauterine

Expand

Baseline Allergies



No known allergy (SNOMED CT 716186003) - 2017-12-08

For full REDCap functionality, log in to REDCap in your web browser.



Workflow-Neutral Data Flow

(this time from REDCap ... after typing in MRN)

REDCap
Logged in as harrispa | Log out
My Projects or Control Center
REDCap Messenger

Project Home and Design
Project Home · Project Setup
Designer · Dictionary · Codebook
Project status: Development

Data Collection
Record Status Dashboard
- View data collection status of all records
Add / Edit Records
- Create new records or edit/view existing ones
Study ID 3 [Select other record](#)
Data Collection Instruments:
Demographics
Visit 1

Applications
Alerts & Notifications
Calendar
Data Exports, Reports, and Stats
Data Import Tool
Data Comparison Tool
Logging
Field Comment Log
File Repository
User Rights and DAGs
Customize & Manage Locking/E-signatures
Data Quality
API and API Playground
REDCap Mobile App
External Modules

Help & Information
Help & FAQ

DDP_On_FHIR_Example
Actions: [Modify instrument](#) [Download PDF of instrument\(s\)](#) [VIDEO: Basic data entry](#)

Demographics
Adding new Study ID 3
Study ID 3
Consent Information
Medical Record Number
Date subject signed
Upload the patient's
Contact Information
First Name
Last Name
Residence - Street Address
Residence - City
Residence - Zip Code
Phone number
E-mail
Ethnicity

Fetching preview data from eStar
REDCap is currently fetching preview data for this record. Once it has completed, review the preview data below to ensure that the values match the record you wish to pull from the external source system. If they are correct, click the Save button to save this value and automatically begin fetching data from the source system. If the data displayed below is not correct for the value you entered, click Cancel to change the value.

Are the values below correct for [redacted]
id: [redacted]
name-given: **Paul**
name-family: **Harris**

[Save record and fetch data](#) [Cancel](#)



Workflow-Neutral Data Flow (this time from REDCap ... after typing in MRN)

REDCap

Logged in as harrispa |

My Projects or Settings

REDCap Messenger

Project Home and Design

Project Home · Project Designer · Dictionary

Project status: Development

Data Collection

Record Status Dashboard · View data collection status

Add / Edit Records · Create new records or edit existing records

Study ID [REDACTED]

Data Collection Instruments

Demographics

Visit 1

Lock all instruments

Applications

Alerts & Notifications

Calendar

Data Exports, Reports

Data Import Tool

Data Comparison Tool

Logging

Field Comment Log

File Repository

User Rights and Roles

Customize & Manage

Data Quality

API and API Playground

REDCap Mobile App

External Modules

Help & Information

Adjudicate data from eStar

[View DDP adjudication instructions](#)

Fetching data for Study ID "3"

Refresh data from eStar

New items: 13 Time of last data fetch: less than a minute ago MRN: [REDACTED]

☒ Display all items (all forms)
☐ Display only this form's items

REDCap Field	REDCap Date/Time	eStar Source Date/Time	REDCap Current Value	eStar Source Value	Import?
Demographics					
first_name "First Name"	-	-		Paul	<input checked="" type="radio"/> reset
last_name "Last Name"	-	-		Harris	<input checked="" type="radio"/> reset
street_address "Residence - Street Address"	-	-		NASHVILLE	<input checked="" type="radio"/> reset
city "Residence - City"	-	-		TN	<input checked="" type="radio"/> reset
zip_code "Residence - Zip Code"	-	-		[REDACTED]	<input checked="" type="radio"/> reset
telephone_1 "Phone number"	-	-		[REDACTED]	<input checked="" type="radio"/> reset
ethnicity "Ethnicity"	-	-		[REDACTED]	<input checked="" type="radio"/> reset
race "Race"	-	-		[REDACTED]	<input checked="" type="radio"/> reset
sex "Gender"	-	-		[REDACTED]	<input checked="" type="radio"/> reset
dob "Date of birth"	-	-		[REDACTED]	<input checked="" type="radio"/> reset
baseline_meds "Baseline Medication List"	-	-		[REDACTED]	<input checked="" type="radio"/> reset
problem_list "Baseline Problem List"					

Save Cancel



Data Flow Based on Temporal Input (e.g. Visit Dates) (Enter Date and REDCap Fetches Data From EHR)

REDCap
Logged in as harrisa | Log out
My Projects or Control Center
REDCap Messenger

Project Home and Design
Project Home · Project Setup
Designer · Dictionary · Codebook
Project status: Development

Data Collection
Record Status Dashboard
- View data collection status of all records
Add / Edit Records
- Create new records or edit/view existing ones
Study ID 3 [redacted] [Select other record](#)
Data Collection Instruments:
Demographics
Visit 1
Lock all instruments

Applications
Alerts & Notifications
Calendar
Data Exports, Reports, and Stats
Data Import Tool
Data Comparison Tool
Logging
Field Comment Log
File Repository
User Rights and DAGs
Customize & Manage Locking/E-signatures
Data Quality
API and API Playground
REDCap Mobile App
External Modules

DDP_On_FHIR_Example
Actions: [Modify instrument](#) [Download PDF of instrument\(s\)](#) [VIDEO: Basic data entry](#)

Visit 1
Editing existing Study ID 3 (011676640 - Harris, Paul) **5 new items from source system** [View](#)

Study ID 3

Visit Date 1 [redacted] 2019 [calendar icon] Today M-D-Y

Height (cm) [input field]

Weight (kg) [input field]

eGFR [input field]

Sodium Level (mmol/L) [input field]

Potassium Level (mmol/L) [input field]

Chloride Level (mmol/L) [input field]

Carbon Dioxide (mmol/L) [input field]

Anion Gap [input field]

Glucose [input field]

Form Status

Complete? Incomplete



Data Flow Based on Temporal Input (e.g. Visit Dates)

REDCap DDP_On_FHIR_Example

Logged in as harrispa | Log out

Actions: [Modify instrument](#) [Download PDF of instrument\(s\)](#) [VIDEO: Basic data entry](#)

[Save & Exit Form](#) [Save & Stay](#)

[My Projects](#) or [REDCap Messenger](#)

Project Home and Design

- [Project Home](#)
- [Designer](#)
- [Project status: Development](#)

Data Collection

- [Record Status Dashboard](#)
- [Add / Edit Records](#)
- [Study ID 3](#)

Data Collection Instruments:

- [Demographics](#)
- [Visit 1](#)
- [Lock all instruments](#)

Applications

- [Alerts & Notifications](#)
- [Calendar](#)
- [Data Exports, Reports](#)
- [Data Import Tool](#)
- [Data Comparison Tool](#)
- [Logging](#)
- [Field Comment Log](#)
- [File Repository](#)
- [User Rights and Roles](#)
- [Customize & Manage](#)
- [Data Quality](#)
- [API and API Playground](#)
- [REDCap Mobile App](#)
- [External Modules](#)

Adjudicate data from eStar

[View DDP adjudication instructions](#)

Fetching data for **Study ID "3"** using **± 3 days** [Refresh data from eStar](#) using **± 3** days from date AND time
min: 0.01 days (15 minutes), max: 365 days

New items: 5 Time of last data fetch: just now **MRN: 011676640** ☒ Display all items (all forms) ☐ Display only this form's items [View 13 hidden items \(existing values\)](#)

REDCap Field	REDCap Date/Time	eStar Source Date/Time	REDCap Current Value	eStar Source Value	Import?
Demographics					
Visit 1					
height_1 "Height (cm)"					<input checked="" type="radio"/> reset
weight_2 "Weight (kg)"					<input checked="" type="radio"/> reset
sodium "Sodium Level (mmol/L)"					<input checked="" type="radio"/> reset
anion_gap "Anion Gap"					<input checked="" type="radio"/> reset
glucose "Glucose"					<input checked="" type="radio"/> reset

[Save](#) [Cancel](#)

Complete? ☒ [Incomplete](#)

FIRST USE CASE: CRF MAPPING



Any chance
you could
integrate in
some way
with our EHR?

50%

WE LOVE IT!

FIRST USE CASE: CRF MAPPING



Any chance
you could
integrate in
some way
with our EHR?

50%

THAT ISN'T WHAT
I HAD IN MIND
→ Data Mart

SECOND USE CASE: DATA MART

1

If pulling time-based data, select the range of time from which to pull data (optional)

from to

2

Enter medical record numbers of patients to import from the EHR (one per line, optional)

Total MRNs: 0

Create Project

Choose fields in EHR for which to pull data

Source Fields List

Filter:

☒ **id (Medical record number)**

+ **Demographics**

0/13 selected

select all

+ **Condition**

0/1 selected

select all

+ **Medications**

0/1 selected

select all

+ **Allergy Intolerance**

0/1 selected

select all

+ **Vital Signs**

0/87 selected

select all

+ **Laboratory**

0/3163 selected

select all

REDCap®

Logged in as harrispa | Log out

My Projects or Control Center

REDCap Messenger

Project Home and Design

Project Home | Project Setup

Designer | Dictionary | Codebook

Project status: Development

Data Collection

Record Status Dashboard

Add / Edit Records

Clinical Data Mart

Study ID 1 (MRN: 010533644) | Select other record

Applications

Alerts & Notifications

Calendar

Data Exports, Reports, and Stats

Data Import Tool

Data Comparison Tool

Logging

Field Comment Log

File Repository

User Rights and DAGs

Customize & Manage Locking/E-signatures

Data Quality

API and API Playground

REDCap Mobile App

External Modules

Help & Information

Help & FAQ

Video Tutorials

Suggest a New Feature

Contact REDCap administrator

Data Mart Example

Record Home Page

The grid below displays the form-by-form progress of data entered for the currently selected record. You may click on the colored status icons to access that form/level.

Choose action for record

Study ID 1 (MRN: 010533644)

Data Collection Instrument	Status
Project Settings	
Demography	
Vital Signs	
Labs	
Medications	
Problem List	
Allergies	

Repeating Instruments

Problem List (16)

1

Hyperlipidemia Hyperlipidemia (disorder)

2

Hypertension Hypertensive disorder, systemic arterial (disorder)

3

Attention deficit hyperactivity disorder (ADHD), combined type Attention deficit hyperactivity disorder, combined type (disorder)

4

Sleep apnea Sleep apnea (disorder)

5

Dyspnea on exertion Dyspnea on exertion (finding)

6

Gastroesophageal reflux disease Gastroesophageal reflux disease (disorder)

7

Coronary artery abnormality Disorder of coronary artery (disorder)

8

Type 2 diabetes mellitus (CMS/HCC) Diabetes mellitus type 2 (disorder)

9

Difficulty breathing Difficulty breathing (finding)

10

Asthma Asthma (disorder)

11

Atrial fibrillation (CMS/HCC) Atrial fibrillation (disorder)

12

Neck pain Neck pain (finding)

Legend for status icons:

Incomplete

Incomplete (no data saved)

Unverified

Many statuses (all same)

Complete

Many statuses (mixed)

REDCap®

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My Projects or Control Center

REDCap Messenger

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Data Quality

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REDCap Mobile App

Data Mart Example

Actions: Modify instrument Download PDF of instrument(s) VIDEO: Basic data entry

Problem List

Current instance: 1 - Hyperlipidemia Hyperlipidemia (disorder)

Editing existing Study ID 1 (MRN: 010533644)

Study ID 1

Problem recorded date 2011-06-13 Today Y-M-D

Problem clinical status active

ICD-10-CM

Problem ICD-10-CM display Hyperlipidemia

Problem ICD-10-CM code E78.5

ICD-9-CM

Problem ICD-9-CM display Hyperlipidemia

Problem ICD-9-CM code 272.4

SNOMED CT

Problem SNOMED CT display Hyperlipidemia (disorder)

Problem SNOMED CT code 55822004

Form Status

Complete? Complete

Lock this record for this form?

If locked, no user will be able to edit this record on this form until someone with Lock/Unlock privileges unlocks it.

Lock

Save & Exit Form Save & ...

SECOND USE CASE: DATA MART



**Any chance
you could
integrate in
some way
with our EHR?**

50%

WE LOVE IT!

Agenda

- Introducing REDCap & REDCap Consortium
- Inventing: EHR + EDC Interoperability
- Innovating: Applied Model for Clinical Trials

**Real
World**



Changing the world **at Vanderbilt**

REDCap / *Epic* Report Out



eStar



- Dynamic Data Pull (DDP) - Clinical Data Pull

Data values pulled from source system via DDP on FHIR: **228,966**

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Records with data values adjudicated by users via DDP on FHIR: **1,762**

Projects with data values adjudicated by users via DDP on FHIR: **11**

Projects with DDP on FHIR enabled: **19**

**Real
World**



Changing the world ~~at Vanderbilt~~

Control Center Home

- [Notifications & Reporting](#)
- [To-Do List 6](#)

Dashboard

- [System Statistics](#)
- [Activity Log](#)
- [Activity Graphs](#)
- [Map of Users](#)

Projects

- [Browse Projects](#)
- [Edit a Project's Settings](#)

Users

- [Browse Users](#)
- [Add Users \(Table-based Only\)](#)
- [User Whitelist](#)
- [Email Users](#)
- [API Tokens](#)
- [Administrators & Acct Managers](#)

Technical / Developer Tools

- [External Modules](#)
- [API Documentation](#)
- [Plugin, Hook, & External Module Documentation](#)
- [MySQL Dashboard](#)
- [MySQL Simple Admin](#)

Miscellaneous Modules

- [Dynamic Data Pull \(DDP\) - Custom](#)
- [DDP on FHIR with EHR Launch](#)
- [Custom Application Links](#)
- [Publication Matching](#)
- [Find Calculation Errors in Projects](#)

System Configuration

- [Configuration Check](#)
- [General Configuration](#)
- [Security & Authentication](#)
- [User Settings](#)
- [File Upload Settings](#)
- [Modules/Services Configuration](#)
- [Field Validation Types](#)
- [Home Page Settings](#)
- [Project Templates](#)
- [Default Project Settings](#)
- [Footer Settings \(All Projects\)](#)
- [Cron Jobs](#)

External Modules

- [Admin Dashboard](#)

DDP on FHIR with EHR Launch



REDCap can communicate with any EHR (electronic health record system) that has implemented 'SMART on FHIR' web services that allow for interoperability and data extraction from the EHR. In this way, REDCap can be embedded inside and launched within an EHR user interface (e.g., Cerner, Epic Hyperspace), which allows REDCap users to easily add patients to their projects and/or to access patient data inside a REDCap project. In addition to launching REDCap inside the EHR, REDCap can also extract data from the EHR to import clinical data into a REDCap project by using a feature called 'DDP on FHIR' (Dynamic Data Pull using SMART on FHIR). DDP on FHIR provides an adjudication process whereby REDCap users can approve all incoming data from the EHR before the data is officially saved in their REDCap project.

Before 'DDP on FHIR with EHR Launch' can be used by REDCap users, it must first be set up and enabled on this page. To get started, download the ZIP file linked below, and follow the instructions contained therein. There may be instructions for your particular EHR, but if not, then you may use the 'Instructions - General' file. After you have followed the setup procedures, all REDCap users who wish to use this feature must first launch REDCap from within the EHR user interface. That step is the starting point for all users and is mandatory for REDCap to determine that the user truly has access to the EHR. Once that step has been completed, the REDCap user may use DDP on FHIR solely from the REDCap side (without being inside the EHR), if they wish, for any projects that have DDP on FHIR enabled, or they can utilize REDCap as launched from within the EHR as well.

[Setup instructions and technical specifications \(ZIP\)](#)

[Informational page on how to use DDP \(for providing to users\)](#)

Enable 'DDP on FHIR with EHR Launch'

Enabled

Once DDP on FHIR is enabled for the system, it can then be enabled for a given project by an Administrator on the project's Project Setup page (in the 'optional modules and customizations' section). Also, users that launch REDCap from inside the EHR system will be able to access their DDP on FHIR projects from the EHR interface.

Custom name for the EHR system

Epic

This will be the name of the EHR system as it is displayed for the user. If left blank, it will simply say 'EHR' in its place.

e.g., Epic, Cerner, EMR, EDW

Redirect URL (to add to your FHIR client for REDCap)

Copy and paste the Redirect URL below and provide it to your EHR technical team to be added to your FHIR client.

Redirect URL (read-only):

EHR-specific and FHIR-specific settings

Client ID and Client Secret for the FHIR app/client created for REDCap in the EHR

These are essentially a username and API key that REDCap will use to communicate with your EHR using the SMART on FHIR services. These client values will likely need to be generated for you by your EHR's technical team.

Client ID:

Client Secret:

..... [Show secret](#)

(Make sure that the Client Secret is the secret value itself and not the stored hashed value of the secret.)




Setting up REDCap on FHIR



REDCap / *Epic* Report Out

Launched

✱ View What's New

 35

← Back to apps

 **REDCap**

Functional Areas
Q Research

Epic Versions
✓ Epic 2017 ✓ Epic 2018

Features
✓ Incoming API

Feb 2019 → . Oct 2019

Current
App Orchard
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Ranking
#6 of 187 Apps

Organization
organization

- Allina Health
- BJC HealthCare & Washington University
- CHEO
- Children's Healthcare of Atlanta
- Cliniques universitaires Saint-Luc
- Fairview Health Services
- Great Ormond Street Hospital for Children
- HealthPartners
- Hennepin Healthcare
- Houston Methodist
- Medical University of South Carolina
- Memorial Healthcare System (FL)
- Michigan Medicine
- Montefiore Medical Center
- Mount Sinai Health System
- New York Consortium
- North Oaks Health System
- Oregon Health & Science University
- Partners HealthCare
- Royal Children's Hospital Melbourne
- St Joseph's Healthcare Hamilton
- The Hospital for Sick Children
- The Ohio State University Wexner Medical Center
- The University of Kansas Hospital
- UC Health
- UCSF Health
- UNC Health Care System
- Univ of Texas MD Anderson Cancer Center
- University of Chicago Hospitals
- University of Colorado Health
- Vanderbilt University Medical Center
- Wake Forest Baptist Health
- WellStar
- Yale New Haven Health System and Yale School of Medicine

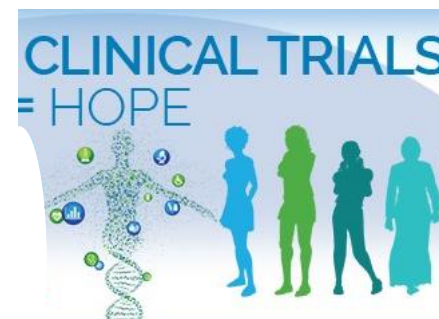
Changing the world at...



What if ...



Better, Cheaper, Faster

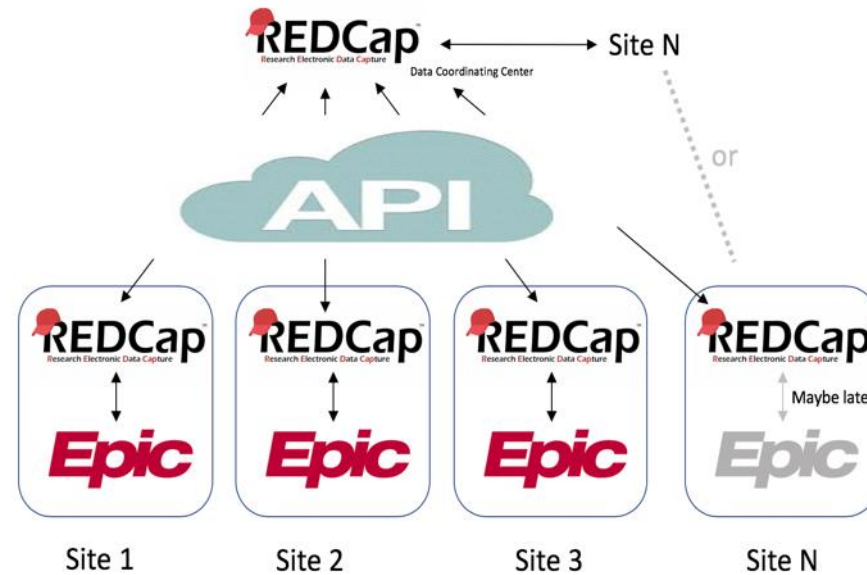


INVENT NEW METHODS

**Real
World**



Democratizing EHR extraction methods should Improve efficiency in multi-site data collection



High-Level Data Flow Schematic

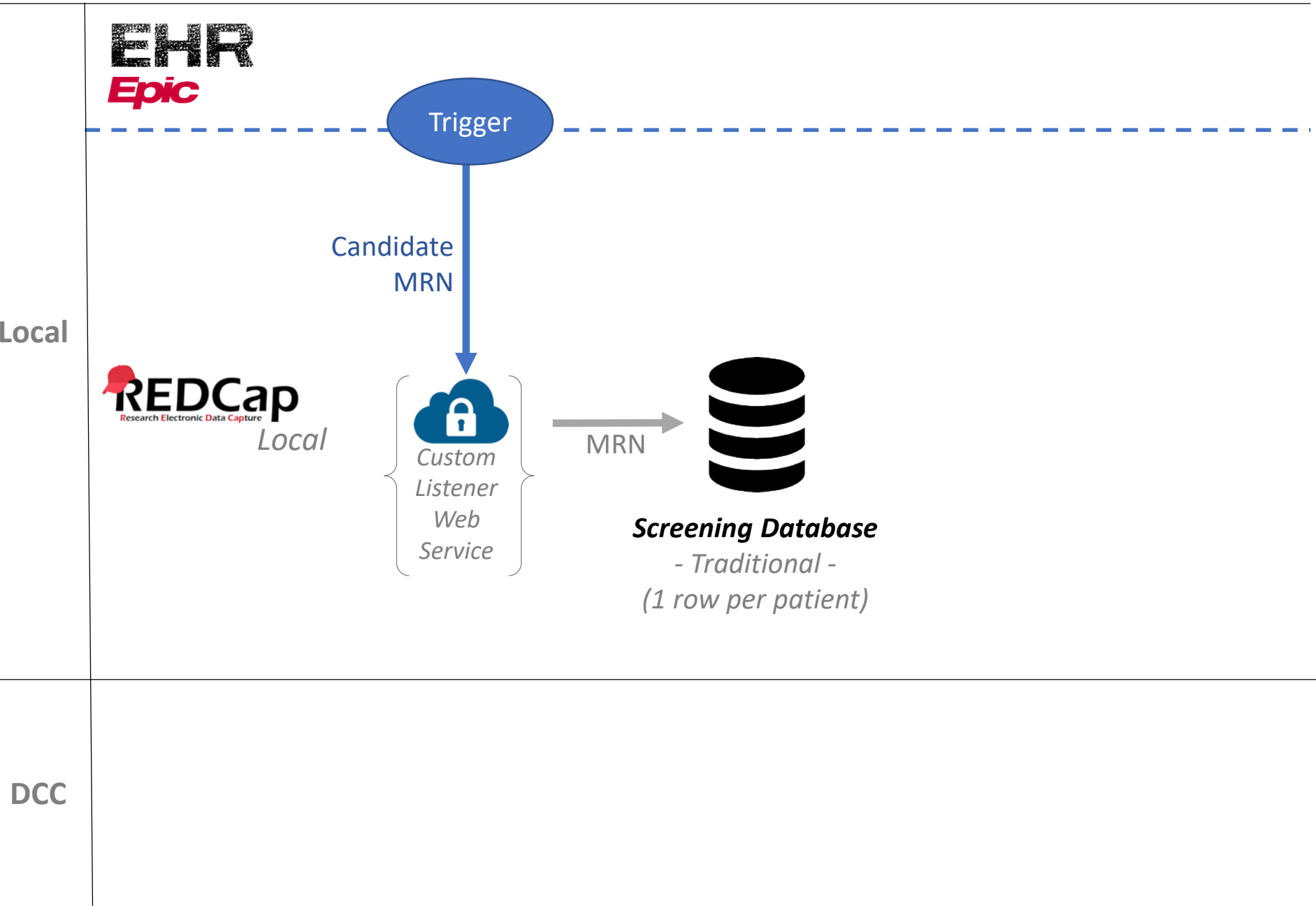
EHR
Epic

Local

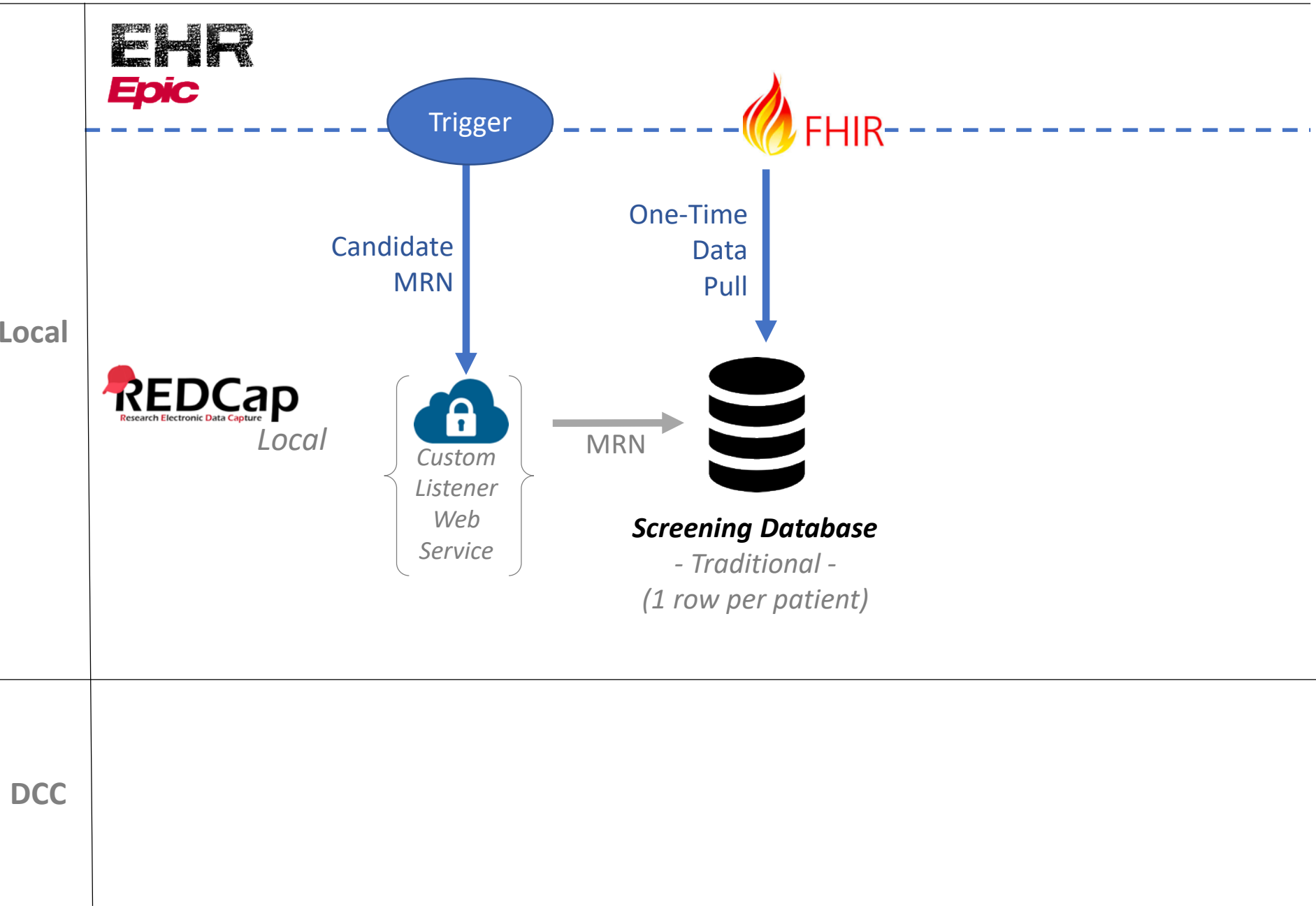
 **REDCap**
Research Electronic Data Capture
Local

DCC

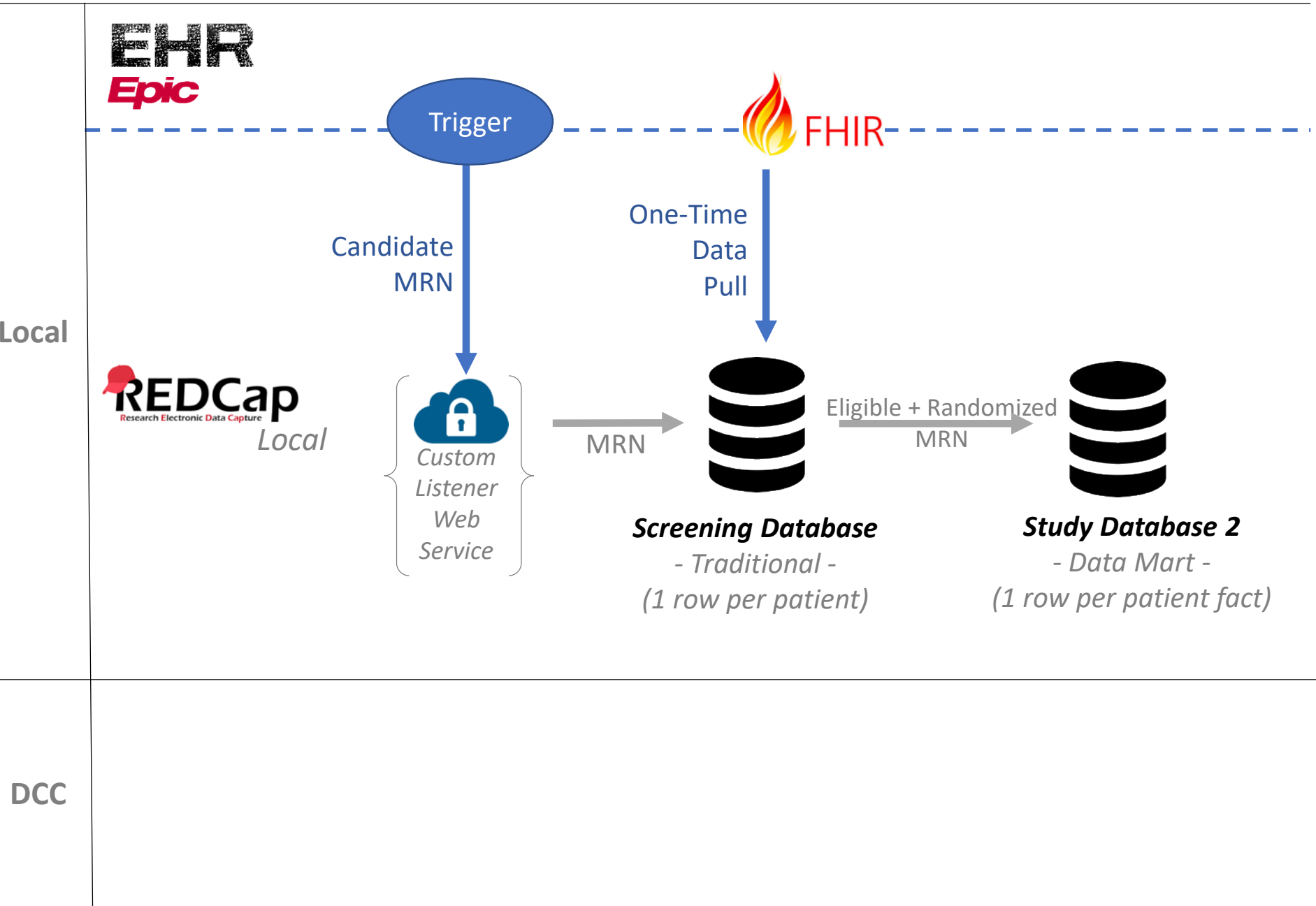
High-Level Data Flow Schematic



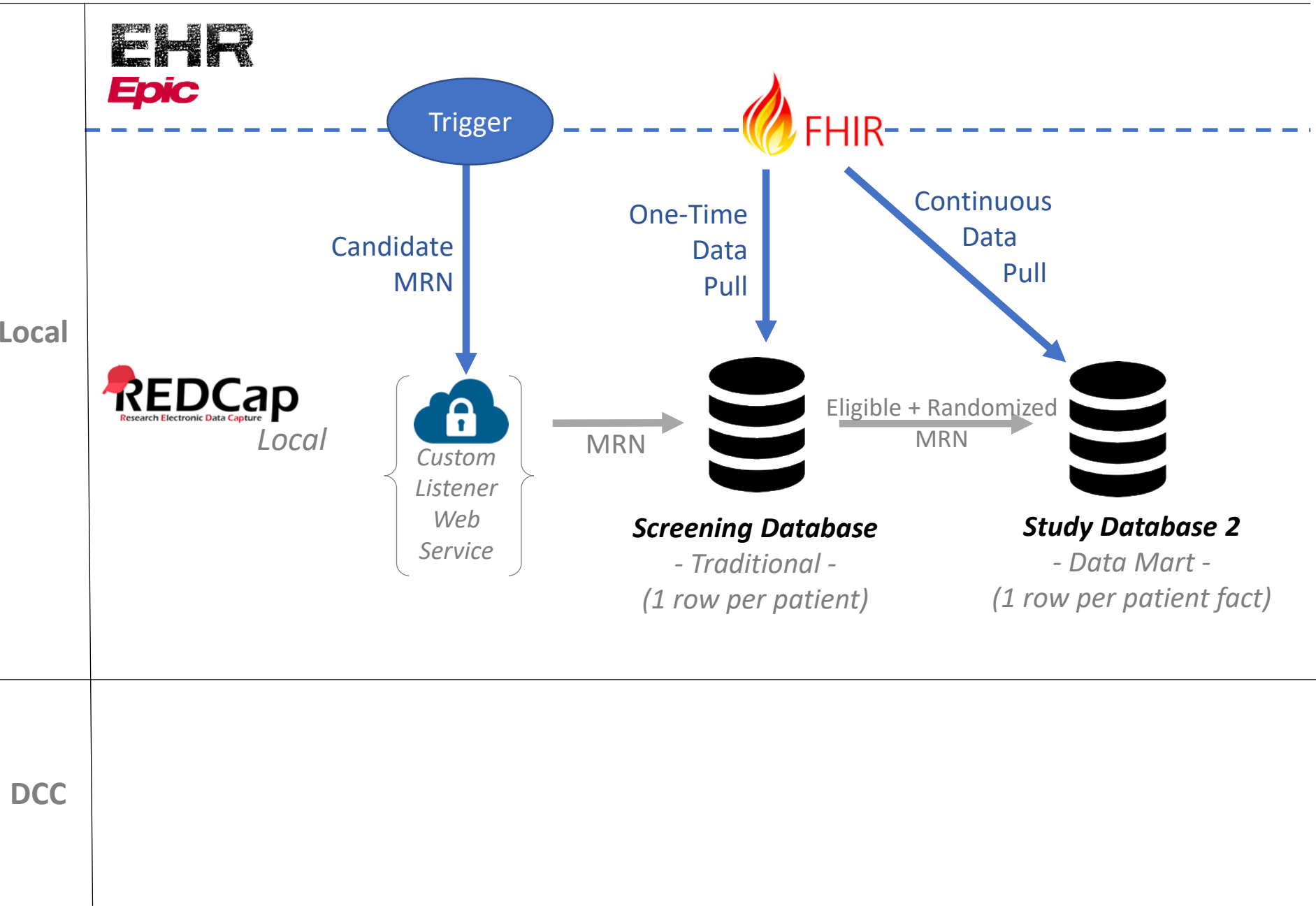
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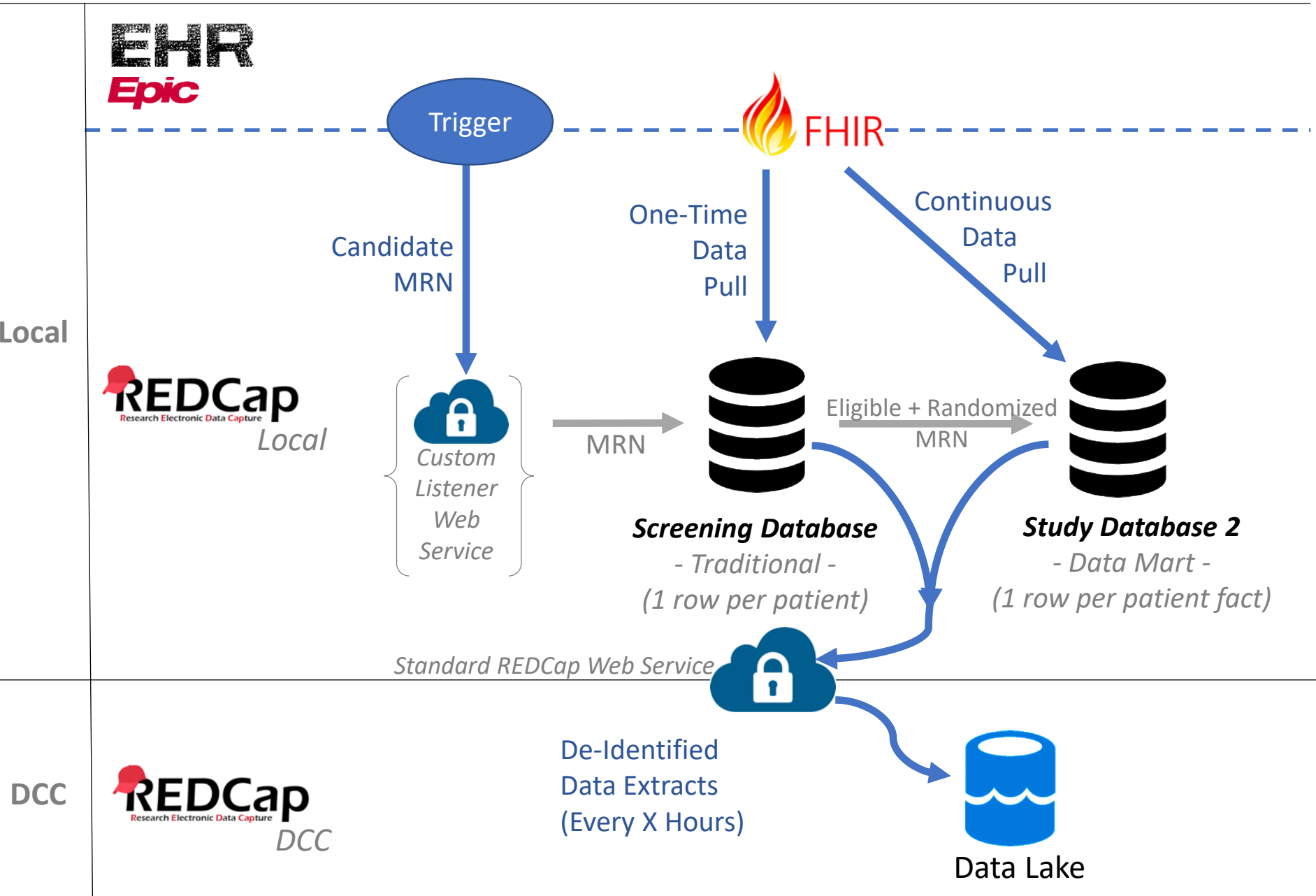
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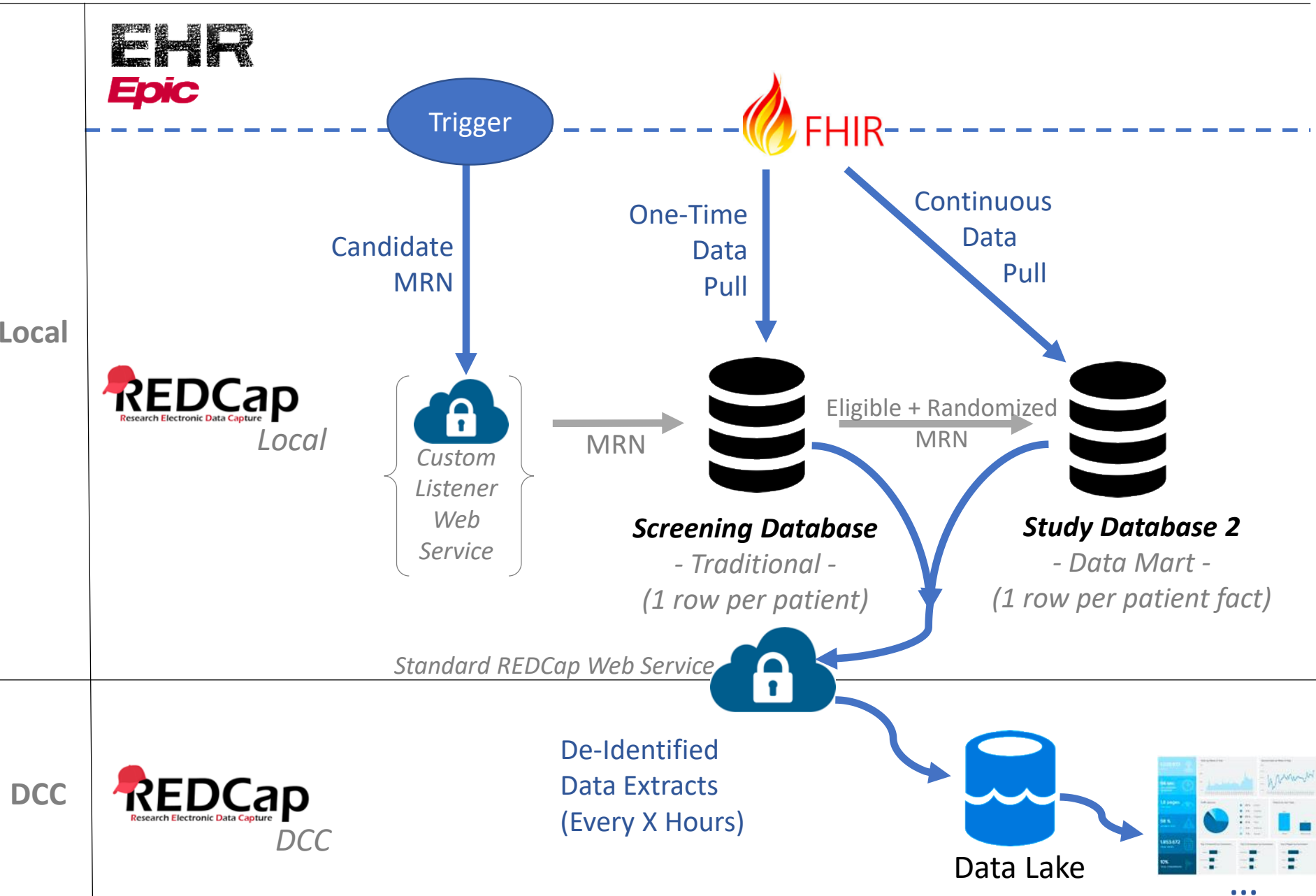
High-Level Data Flow Schematic



High-Level Data Flow Schematic

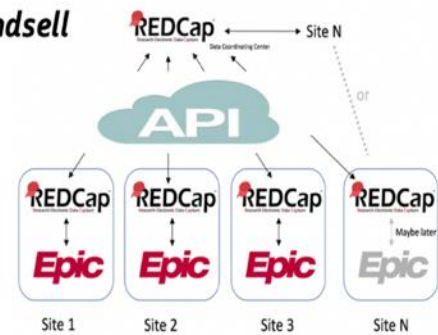


High-Level Data Flow Schematic



REDCap / *Epic* Report Out

04/2019 - First Funded Trial (5 Sites) – Harris/Lindsell



Trial Innovation Network



Duke Clinical Research Institute



VANDERBILT
UNIVERSITY
MEDICAL
CENTER



Benjamin



UNIVERSITY OF UTAH
HEALTH CARE



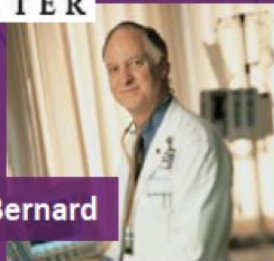
Ford



JOHNS HOPKINS
MEDICINE



Dean



Bernard

CTSA Clinical & Translational[®]
Science Awards



Hanley

Tufts Medical Center



Selker



National Institute
on Aging



Harris



VANDERBILT
UNIVERSITY
MEDICAL
CENTER



Wilkins



National Center
for Advancing
Translational Sciences



CTSA Clinical & Translational[®]
Science Awards



Trial Innovation Network



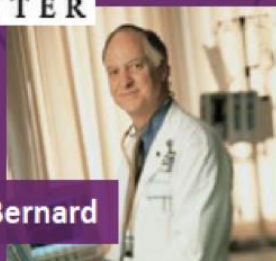
Duke Clinical Research Institute



VANDERBILT
UNIVERSITY
MEDICAL
CENTER



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UNIVERSITY OF UTAH
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Dean

CTSA

Clinical & Translational
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VANDERBILT
UNIVERSITY
MEDICAL
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MEHARRY
MEDICAL COLLEGE



Ford



JOHNS HOPKINS
MEDICINE



Hanley

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CTSA Clinical & Translational
Science Awards



Trial Innovation Network



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UNIVERSITY OF UTAH
HEALTH CARE



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NLM



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Science Awards



REDCap / *Epic* Report Out

Launched

✱ View What's New



35

← Back to apps



REDCap

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University of Colorado Health
Vanderbilt University Medical Center
Wake Forest Baptist Health
WellStar
Yale New Haven Health System and Yale School of Medicine

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Current
App Orchard
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Ranking
#6 of 187 Apps

Local Impact



- Dynamic Data Pull (DDP) - Clinical Data Pull

Data values pulled from source system via DDP on FHIR: **228,966**

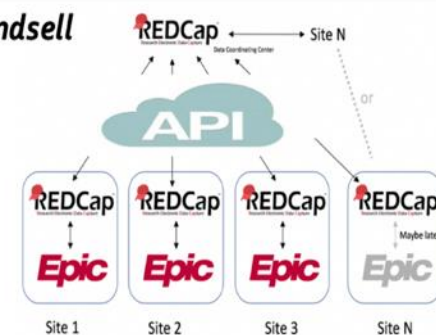
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04/2019 - First Funded Trial (5 Sites) – Harris/Lindsell



Next

CTSA



New Recruitment /
Retention Tools



Embed in TIN
Trials (CTSA Adoption)

REDCap / *Epic* Report Out

Launched

✱ View What's New



35

← Back to apps



REDCap

Functional Areas

Research

Epic Versions

✓ Epic 2017 ✓ Epic 2018

Features

✓ Incoming API

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organization

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The University of Kansas Hospital

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UNC Health Care System

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eStar



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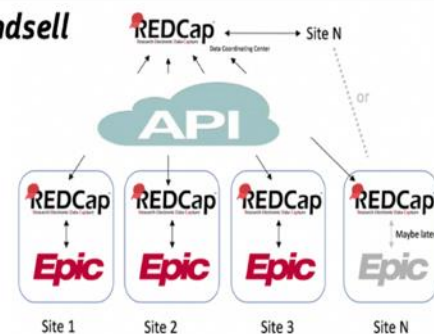


flower bed

WORKFLOW FOR EHR-EMBEDDED CLINICAL TRIALS



National Heart, Lung, and Blood Institute



Feb 2019 → Oct 2019

Current
App Orchard
Download
Ranking
#6 of 187 Apps

Next

CTSA

r!C RECRUITMENT
INNOVATION
CENTER

TRIAL INNOVATION NETWORK

New Recruitment /
Retention Tools

Embed in TIN
Trials (CTSA Adoption)

NEW

NIH NLM

National Library of Medicine Promoting EHRs & FHIR for
Improving of Clinical Research

Thank You!



What about ...



Specific Data Types

Roadmap

Paul.Harris@Vanderbilt.Edu